

*** TRANSMISSION REPORT ***

JUN-15-98 09:27

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USEPA REGION 5

JOB NUMBER

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TELEPHONE NUMBER

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NAME (ID NUMBER)

Dales

START TIME

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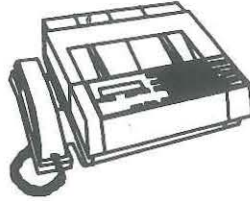
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590



FACSIMILE REPORT AND COVER SHEET	
OFFICE/TELEPHONE OF RECIPIENT:	MACHINE NO. 906 863 8425
TO: Dale Paper, Sr.	
FROM: Diane Sharrow	
TELEPHONE NUMBER (FTS or commercial): 312-860-6199	
COMMENTS:	
DATE: 6/15/98	
PLEASE NUMBER ALL PAGES	
NUMBER OF PAGES, INCLUDING COVER SHEET: PAGE 1 OF 2	



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590



FACSIMILE REQUEST AND COVER SHEET

FTS: 353-4342
COMM: 312/353-4342

METCALFE FEDERAL BUILDING
VERIFICATION NO. 353-3808

OFFICE/TELEPHONE
OF RECIPIENT:

MACHINE NO. 906 863 8425

906 863 9534

TO:

Dale Paper, Sr.

FROM:

Diane Sharrow

TELEPHONE NUMBER (FTS or commercial):

312-886-6199

COMMENTS:

DATE:

6/15/98

PLEASE NUMBER ALL PAGES

NUMBER OF PAGES, INCLUDING COVER SHEET:

PAGE 1 OF 2

BY FACSIMILE:

15 June 1998

Mr. Dale K. Pape, Jr.
906-863-8425

I have been out of the office and have just returned this morning. Because I was out in the field, I just received your faxes that requested split sampling and document review. I tried to call you at the number listed on your faxes and there was no answer, so that is why I am sending this reply by facsimile. If you have any questions or concerns, please call me at -312-886-6199.

Let me make clear, that neither I or the USEPA are unwilling to discuss the Manistique Paper (MPI) RMA. You are welcome to review USEPA's files under the Freedom of Information Act. But you need to contact Wendy Schumacher, the Chicago FOIA Officer, at 312-886-0182 to arrange the review. All RCRA files on MPI's RMA are in the RCRA File Room, except for those that are enforcement sensitive. There may also be files on MPI in the Superfund File Room and the Water Division File Room, but I am not sure whether any of these files contain info on the RMA; they would mostly be on the Harbor and the NPDES permit. The RCRA enforcement sensitive files are not available to MPI or the public due to USEPA's ongoing investigation of the RMA, and these files are in my possession.

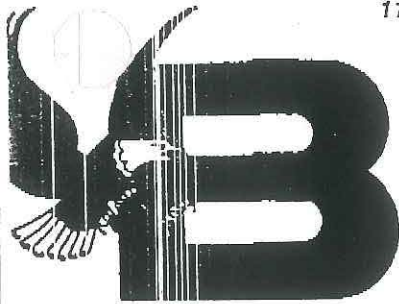
The USEPA has only released the RCRA sampling results from the November 1997 sampling inspection; the report from this RCRA sampling inspection is draft and has not been finalized. USEPA intends to finalize the report once the RCRA sampling inspection results from the June 1998 re-sampling are analyzed and reviewed.

Once again, if you have any questions, please contact me.

Diane Sharrow
Environmental Scientist

BITTNER ENGINEERING, INC.

113 SOUTH 10TH STREET, ESCANABA, MICHIGAN 49829 • 906-789-1511



May 20, 1994

Mr. Duane Roskoskey,
Environmental Quality Analyst
Michigan Department of Natural Resources
P.O. Box 30241
Lansing, MI 48909

RE: Manistique Papers' Inert Designation
Request

Dear Mr. Roskoskey:

You will recall we had a telephone conversation in early April in which we discussed your concerns about aluminum and manganese. Based on that conversation, and prior to receiving your letter of April 27, 1994, we collected several background samples of clay from locations in Ontonagon and Munising and tested them for aluminum. These locations were selected because clay from Ontonagon and Munising is used for landfill liner and cover throughout the Upper Peninsula. In addition we tested a common over-the-counter antacid, Maalox, and two synthetic clays -- Gunseal Bentonite and Bento-mat Bentonite for their aluminum content.

As you can see from the chart below, the results confirm that the level of aluminum found in Manistique's residuals is well below that found naturally occurring in Upper Peninsula clay. The results from the testing of Gunseal indicate that the levels of aluminum in Manistique's residuals are approximately the same as those in Gunseal and the aluminum levels in the Bento-mat are higher than Manistique's residuals. Perhaps the most surprising result is the level of aluminum found in Maalox -- an antacid that is ingested daily by millions of people.

ALUMINUM TEST RESULTS MAY 1994

<u>SOURCE</u>	<u>TOTAL COMPOSITION ANALYSIS</u>	<u>SYN PCPT. LEACHING PROC.</u>
Ontonagon Clay	15,000 mg/kg	4.4 mg/l
Munising Clay	14,000 mg/kg	4.5 mg/l
Gunseal Bentonite	6,200 mg/kg	16 mg/l
Bento-mat Bentonite	9,100 mg/kg	1.3 mg/l
Maalox	54,000 mg/kg	20 mg/l
<u>Manistique's Residuals</u>	6,870 mg/kg	0.65 mg/l

DENNIS B. BITTNER, P.E., PRESIDENT

Mr. Duane Roskoskey

May 20, 1994

Page 2

With results like these, any other conclusion but that Manistique's residuals are inert would be absurd. Are all the natural clay lined and covered landfills in the Upper Peninsula actually 307 sites because of their aluminum content? Is the supposed health-based risk standard attributed to aluminum not applicable to an over-the-counter drug ingested on a daily basis? Surely the answer to these questions is "no."

Even though the samples were taken prior to receiving your April 27 letter discussing the guidelines for developing background samples, we believe these results are strong support for our petition for inertness designation for Manistique's residuals. Obviously, if we would have had these results earlier, it would have made both our jobs much easier.

I will call you in the next several days after you have had a chance to review these results.

Sincerely,

A handwritten signature in dark ink, appearing to read "Dennis B. Bittner", written over the word "Sincerely,".

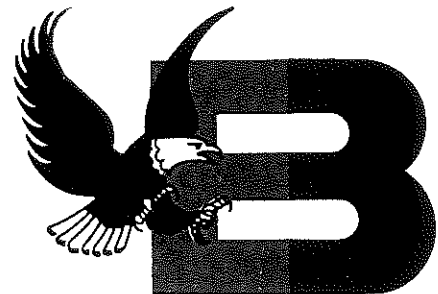
Dennis B. Bittner, P.E.
Project Manager

DBB/jr

cc: Mr. Frank Opolka, Deputy Director
Mr. Jack Rydquist, SWQD
Mr. Robert Schmeling, II
Mr. Karl Zollner
Mr. John Craig
Mr. Leif Christensen
Mr. James Cook
Mr. Jason Panek
Mr. Tom Arnold

BITTNER ENGINEERING, INC.

614 LUDINGTON STREET, ESCANABA, MICHIGAN 49829 • 906-789-1511



September 17, 1987

Mr. Clif Clark
Waste Management Division
Michigan Department of Natural Resources
1990 U. S. 41 South
Marquette, Michigan 49855

RE: Manistique Paper's Landfill
Hydrogeo Study

Dear Clif:

This letter is written in response to your May 21, 1987 letter on this subject. The following comments appear in the same order as the comments of your letter.

1. Concur.
2. The samples for leachate analysis were prepared by the procedure of ASTM D3987-85 Shake Extraction of Solid Waste With Water. Additional information on the analytical procedures is contained in the attached report entitled ASTM Water Leachate Report On Soil Samples For Bittner Engineering, Inc., Escanaba, Michigan, March 1987. This method was selected as being the most appropriate to determine if the material is suitable for Type III landfilling. Samples were composited in the laboratory according to accepted procedures.

Samples were composited from all individual samples collected at 5' intervals at boring locations. The reason why some composite samples had more individual samples is that the depth of drilling varied according to the height of the landfill at the boring locations. A map showing the boring locations is included. Borings were advanced through the bottom of the waste and into the native soil in all instances.

3. Total organic carbon and dissolved manganese were analyzed at a later date at representative locations. Sample results are as follows:

DENNIS B. BITTNER, P.E., PRESIDENT

Mr. Clif Clark
September 17, 1987
Page 2

<u>Sample Location</u>	<u>TOC (mg/l)</u>	<u>Dissolved Manganese (mg/l)</u>
K	57	0.066
L	44	<0.02
M	19	0.028

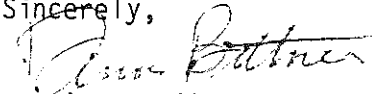
4. Samples have not been analyzed for PCB's on a dry-weight basis. In addition to the fact that it was not recommended in Schmeling's July 2, 1986 letter approving the work study plan, we feel that the results of extensive PCB testing which has been performed on the process wastewater over the years along with the comprehensive leachate testing that has recently been completed indicate that PCB's are not a concern in the mill's solid waste and therefore such testing is not warranted.

In particular, the waste activated sludge has been analyzed for the presence of PCB's. As the attached results show no PCB's were present. The only additional processing of waste activated sludge prior to landfilling is removal of water. Therefore, the results of waste activated sludge sampling for PCB's are representative of the material being landfilled.

5. Samples of wastes to be disposed at the site have been analyzed according to your comment. The results will be included in the hydrogeological study.
6. Concur
7. It is our intention to collect a single set of samples from the observation wells to be submitted with the hydrogeo study and the permit application. The observation wells that will be permanently installed will then be sampled at the frequency necessary to fulfill the requirements of the permit. Please advise if my thinking is incorrect in this matter.

If you have any questions, please feel free to contact me.

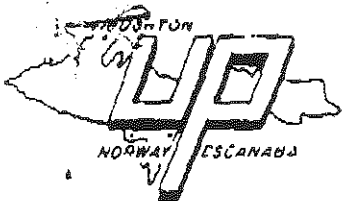
Sincerely,


Dennis B. Bittner, P. E.
Project Manager

Enclosures

CC: Leif Christensen
Jim Cook
Alan Wasserman

DBB/sb



U.P. ENGINEERING AND ARCHITECTURAL ASSOCIATES, Inc.
614 LUDINGTON, ESCANABA, MICHIGAN 49829 • (906) 786-8881

RECEIVED

February 9, 1987

FEB 10 1987

Marquette Dist. G.Q.D.

Mr. Robert Schmeling, P. E.
Michigan Department of Natural Resources
1990 U. S. 41 South
Marquette, Michigan 49855

RE: Manistique Papers, Inc.
Hydrogeological Study

Dear Bob:

As a follow up to our recent telephone conversation, I am proposing the following physical and chemical testing on soil and sludge samples collected during the soil boring phase of this project.

By way of review, we have performed borings at 17 locations. At six of the locations we installed observation wells with screens set in the water table in the unconfined aquifer. Five of the 17 boring locations were in areas of landfilled sludge.

We propose to perform the following analyses:

Soil Locations

- In-site horizontal permeability tests at the 6 well locations.
- Cation exchange capacities at the 6 well locations in the upper 10' of soil.
- Sieve analyses at 6 boring locations at 5' intervals.
- Description of soils from auger bit and split spoon samples by trained technicians at 5' intervals at all locations (already completed).

WP
?

Sludge

- Permeability analysis at each of the boring locations from shelby tube samples collected at a range of depths. This should provide a range of permeabilities encountered at the site.
- Leachate analysis from laboratory composited samples of the 5 sampling intervals.

Mr. Robert Schmeling, P. E.
February 9, 1987
Page 2

- Analysis of the leachate for parameters previously discussed.

Please contact me as soon as your review is completed so that our data collection efforts may proceed according to schedule.

Sincerely,

Dennis B. Birtner
Dennis B. Birtner, P. E.
Associate

U. P. Engineering and
Architectural Associates, Inc.

Bob -
looks good
and

Mike

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

Marquette, Michigan
October 16, 1989

TO: Sheila Meier, Environmental Engineer, WMD
FROM: Carl L. Smith, Geologist, WMD
SUBJECT: Manistique Papers Sampling Review

I have completed my review of Manistique Papers submittal concerning their sampling and analytical procedures by Bittner Engineering dated October 2, 1989. I am concerned that there is a serious possibility for with regard to the procedures listed on page 2 under the heading "Preparatory Cleaning of Sampling Equipment" it is indicated that "Samples will be transferred directly to containers which have been cleaned and prepared by the laboratory". Then on page 2 under the heading "Processing of Samples" it is stated "Any samples requiring preservation will have preservatives applied to the sample bottles at the laboratory." This provides the opportunity for sampling personnel to make the mistake of adding a sample to an acidified sampling container then filtering that sample and reporting the results as dissolved vs total metals. Preservatives should be added in the field only after any necessary filtering to prevent this type of mistake from occurring. Care should be taken to insure the purity of any preservatives used. Samples should be filtered and preserved no more than one hour after purging.

With regard to the appropriateness of the laboratory analytical procedures, I have requested a review by Mr. G. Su of our environmental laboratory in Lansing. He has stated that he will advise this office of his findings no later than October 23, 1989.

In my hydrostudy review dated April 26, 1988 I mentioned the fact that the underlying bedrock is very near the surface and qualifies as a useable aquifer. According to the groundwater contour map, provided with the hydrostudy, groundwater does flow into and conversely out of the landfill. If the landfilled material does not qualify as inert this item could prove to be the critical one.

I have taken the liberty of including with this memo some stiff, piper trilinear and pie diagrams of some of the well data that was submitted over a year ago. From the trends shown it appears obvious that the material in the landfill is causing a very serious effect on the local groundwater quality. We should request an analysis of the leachate for the expanded annual list of parameters (which I can provide) and then perform a detailed review of any trends which appear to be migrating toward the character of the leachate. Again, we should be concerned about not only serious contamination but about various degrees of groundwater degradation as well.

cc:RSII

A handwritten signature in cursive script, likely reading "C. Smith", is positioned to the right of the "cc:RSII" text.

BITTNER ENGINEERING, INC.

614 LUDINGTON STREET, ESCANABA, MICHIGAN 49829 • 906-789-1511



October 2, 1989

RECEIVED

OCT -6 1989

Marquette Dist. W.M.D.

Mr. Robert Schmeling II
Regional Supervisor
Waste Management Division
Michigan Department of Natural Resources
1990 U. S. 41 South
Marquette, Michigan 49855

RE: Manistique Papers, Inc.
Monitoring Plan

Dear Mr. Schmeling:

We have received your September 1, 1989 letter of response to our May 3, 1989 proposal for monitoring and waste characterization plans at Manistique Papers, Inc. Residuals Management Site. The following explanations are furnished in response to your request for additional information regarding sampling and analytical procedures. In general, we will follow procedures discussed in "RCRA - Groundwater Monitoring Technical Enforcement Guidance Document", September 1986. Following is a more specific discussion of our procedures.

IDENTIFICATION OF SAMPLING POINTS

The monitoring program lists 8 well locations and 4 surface water sampling locations. Monitoring wells are identified as W-1 through W-8 and will have the identification numbers clearly printed on the well casing. The surface water sampling locations, R-1, R-2, R-3 and G-1 will be established after preliminary field reconnaissance and the locations will be marked by flagging and painting on trees or stakes located along the shore.

PREPARATION FOR SAMPLING

Prior to sampling, each well will be evacuated using a Teflon bailer. An attempt will be made to remove 3 volumes of water from each well prior to sampling. Wells that do not produce a sufficient flow of groundwater to allow removal of 3 volumes will be bailed dry a single time. Samples will be collected within a short time after the wells recover to the original level.

Surface water sampling locations will be reviewed prior to each sampling to determine the existence of free flowing conditions.

DENNIS B. BITTNER, P.E., PRESIDENT

Mr. Robert Schmeling II
October 2, 1989
Page 2

PREPARATORY CLEANING OF SAMPLING EQUIPMENT

A Teflon bailer with single check valve will be used to purge wells and for withdrawing samples from wells. Preparatory cleaning will consist of washing the bailer and Teflon coated cable with 10% acetone 90% distilled water solution followed by triple rinsing with distilled water. Samples will be transferred directly to containers which have been cleaned and prepared by the laboratory.

Surface water samples will be collected directly in containers provided by the laboratory.

FIELD MEASUREMENTS

Samples for pH, specific conductance, static water level and temperature will be analyzed in the field at the time of sample collection.

Static water levels will be recorded using a steel tape to the nearest 0.01'. Levels will be determined prior to bailing of wells.

The other field tests will be performed on samples obtained from the bailer and transferred to a separate container. Test probes will not be inserted into sample bottles being forwarded to the laboratory for analysis.

Field test equipment will be cleaned in accordance with manufacturer's recommendations and the procedures outlined in "Preparatory Cleaning of Sampling Equipment" of this letter.

PROCESSING OF SAMPLES

Any samples requiring preservation will have preservatives applied to the sample bottles at the laboratory.

Field filtering of samples for dissolved metals will be performed in Manistique Papers, Inc.'s laboratory about a 10 minute trip from the sampling locations. Filtering will be done immediately after sample collection by Bittner Engineering personnel.

All samples will be immediately placed in coolers containing frozen ice packs and ice to bring samples to the required holding temperature as quickly as possible. Prior to shipping to the laboratory, a sufficient number of frozen ice packs will be placed in the cooler and the lid will be tightly sealed. The coolers will be shipped to Western Michigan Environmental Services (WMES) in Holland, Michigan via UPS overnight shipping.

Mr. Robert Schmeling II
October 2, 1989
Page 3

SAMPLING QA/QC MEASURES

- The sample bottles will be labeled prior to mobilizing for sampling. The labeling will be carefully checked in the field to verify that the labeling corresponds to the well or surface water numbering system.
- Care will be taken to keep the decontaminated sampling equipment from coming in contact with the ground or other potential sources of contamination.
- The well sampling order will begin with the upgradient wells and move to the wells the greatest distance downstream and conclude with the downstream well nearest to the residuals site.
- Portable meters for determining pH and specific conductance values will be calibrated at the beginning and the conclusion of each day's sampling program.
- Samples of the final rinse water from the bailer will be collected on each day of sampling. This sample will be labeled "Bailer Blank" and will be submitted for the complete list of analyses for this project.

LABORATORY

All samples, other than those analyzed in the field will be tested by WMES.

Test methods and laboratory QA/QC procedures are listed in correspondence from WMES (attached).

We will add COD and carbonate as CO_3 to the original list of parameters contained in my May 3, 1989 letter.

I trust that upon receipt of this additional information, that you will be able to grant final approval to the monitoring program. Your timely approval will enable us to collect 3 representative samples prior to winter.

WASTE CHARACTERIZATION PLAN

Since we have not received a response to the waste characterization plan contained in our May 3, 1989 letter, we are not responding to the comments of your September 1st letter dealing with this subject. I am concerned that we have not received a response from the Waste Characterization Unit regarding our Waste Characterization Plan. This delay is hampering our ability to

Mr. Robert Schmeling II
October 2, 1989
Page 4

address the permit requirements for the Residuals Management Site. It has been our understanding that this review is being coordinated by your office and that we should direct all inquiries to you. Please advise me if this is the case and when we can expect a response to the Waste Characterization Plan.

If you have any questions, please feel free to contact me.

Sincerely,



Dennis B. Bittner, P. E.
Project Manager

Enclosure

CC: Leif Christensen w/enclosure
Jim Cook w/enclosure
Joe Polito w/enclosure
Dave Dennis w/enclosure
DBB/sb Frank Opolka w/enclosure



Box 1, 30th Avenue, Holland, Michigan 49424 9263
Phone: 616-399-6070 FAX 616-399-6185

Attn: Dennis Bittner
Re: Manistique Papers

ANALYSIS OF: Sludge Samples

DATE RECEIVED: Received from client on July 30, 1994

Lab ID: 9107236-01

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Total Solids	38.1	% of sample	08/11/93	MJR	APHA 2540 B.	N/A
Acid Digestion, Solid	08/05/93	date digested		MSR	EPA 1050	
Aluminum	3,300	mg/kg dry wt.	08/19/93	MSR	EPA 6010	2.5
Manganese	22	mg/kg dry wt.	08/19/93	MSR	EPA 6010	0.050

Lab ID: 4407236-02

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Syn. Pcppt. Leaching Proc.	08/02/93	date extracted		JA	EPA 1312	
Acid Digestion, Aqueous	08/04/93	date digested		MBR	EPA 3010	
Aluminum	0.58	mg/L	08/19/93	MBR	EPA 6010	0.05
Manganese	0.038	mg/L	08/19/93	MBR	EPA 6010	0.001

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WESTERN MICHIGAN ENVIRONMENTAL SERVICES, INC.

1000 West Avenue, Holland, Michigan 49424-9263
Phone 616-399-6070 FAX 616-399-6185

SENT TO: Bittner Engineering, Inc.
113 South 10th Street
Escanaba, Michigan 49829

Attn: Dennis Bittner
Re: Manistique Paper

DATE: August 20, 1993

ANALYSIS OF: Sludge Samples

REPORTED BY: *Robert K. Zahray*
Robert K. Zahray, Laboratory Manager

DATE RECEIVED: Received from client on August 6, 1993.

Sample ID: Press Sludge, Total

Lab ID: 9108081-01

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Total Solids	36.4	% of sample	08/13/93	MJR	APHA 2540 B.	N/A
Acid Digestion, Solid	08/13/93	date digested		MBR	EPA 3050	
Aluminum	2,300	mg/kg dry wt.	08/13/93	MBR	EPA 6010	2.5
Manganese	34	mg/kg dry wt.	08/13/93	MBR	EPA 6010	0.05

Sample ID: Press Sludge, Leachate

Lab ID: 9108081-02

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Syn. Pcp. Leaching Proc.	08/10/93	date extracted		CJK	EPA 1312	
Acid Digestion, Aqueous	08/14/93	date digested		MBR	EPA 3010	
Aluminum	0.42	mg/L	08/19/93	MBR	EPA 6010	0.05
Manganese	0.16	mg/L	08/19/93	MBR	EPA 6010	0.001



WESTERN MICHIGAN
ENVIRONMENTAL SERVICES, INC.

1057 178th Avenue, Holland, Michigan 49424-9263
Phone: 616-399-6070 FAX 616-399-6185

SENT TO: Bittner Engineering, Inc.
113 South 13th Street
Escanaba, Michigan 49829

Attn: Dennis Bittner
Re: Manistique Paper

DATE: September 16, 1993

ANALYSIS OF: Sludge Sample

REPORTED BY: *Robert K. Zahray*
Robert K. Zahray, Laboratory Manager

DATE RECEIVED: Received from client on August 11, 1993.

Sample ID: Press Sludge, Total

Lab ID: 9408103-01

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Total Solids	37.1	% of sample	08/17/93	MJR	APHA 2540 B.	N/A
Acid Digestion, Solid	08/17/93	date digested		JA	EPA 3050	
Aluminum	5,000	mg/kg dry wt.	08/19/93	MBR	EPA 6010	2.5
Manganese	17	mg/kg dry wt.	08/19/93	MBR	EPA 6010	0.5

Sample ID: Press Sludge, Leachate

Lab ID: 9408103-02

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Syn. Pcp. Leaching Proc.	08/17/93	date extracted	08/17/93	WS	EPA 1312	
Acid Digestion, Aqueous	08/24/93	date digested		JA	EPA 3010	
Aluminum	0.19	mg/L	08/14/93	CJK	EPA 6010	0.05
Manganese	0.064	mg/L	08/14/93	CJK	EPA 6010	0.001

Note: Samples composited from sub-samples taken 08/09/93, 08/10/93, 08/11/93, and 08/12/93.



WESTERN MICHIGAN
ENVIRONMENTAL SERVICES, INC.

162 1/8th Avenue, Holland, Michigan 49424-9263
Phone: 616-399-6070 FAX: 616-399-6185

SENT TO: Bittner Engineering, Inc.
113 South 13th Street
Escanaba, Michigan 49829

Attn: Dennis Bittner
Re: Manistique Papers

DATE: September 21, 1993

ANALYSIS OF: Sludge Samples

REPORTED BY: *Robert K. Zahray*
Robert K. Zahray, Laboratory Manager

DATE RECEIVED: Received from client on August 20, 1993

Sample ID: Press Sludge, Total

Lab ID: 9308157-01

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Total Solids	38.1	% of sample	08/25/93	MJR	APHA 2540 B.	N/A
Acid Digestion, Solid	08/25/93	date digested		JA	EPA 3050	
Aluminum	14,000	mg/kg dry wt.	09/17/93	CJK	EPA 6010	50
Manganese	32	mg/kg dry wt.	09/14/93	CJK	EPA 6010	0.050

Sample ID: Press Sludge, Leachate

Lab ID: 9308157-02

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Syn. Pcpt. Leaching Proc.	08/24/93	date extracted	08/24/93	WS	EPA 1312	
Acid Digestion, Aqueous	08/24/93	date digested		JA	EPA 3010	
Aluminum	1.3	mg/L	09/14/93	CJK	EPA 6010	0.05
Manganese	0.099	mg/L	09/14/93	CJK	EPA 6010	0.001

Note: Samples were composited from sub-samples taken 08/16/93, 08/17/93, 08/18/93, and 08/19/93



WESTERN MICHIGAN ENVIRONMENTAL SERVICES, INC.

352 178th Avenue, Holland, Michigan 49424-9263
Phone: 616-399-6070 FAX 616-399-6185

SENT TO: Bittner Engineering, Inc.
113 South 10th Street
Escanaba, Michigan 49829

Attn: Dennis Bittner
Re: Manistique Papers

DATE: September 27, 1993

ANALYSIS OF: Sludge Sample

REPORTED BY: *Robert K. Zahray*
Robert K. Zahray, Laboratory Manager

DATE RECEIVED: Received from client on August 27, 1993

Sample ID: Press Sludge Comp., Total Lab ID: 9408199-01

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Total Solids	36.6	% of sample	09/01/93	MJR	APHA 2540 B	N/A
Acid Digestion, Solid	08/31/93	date digested		CJK	EPA 3050	
Aluminum	10,000	mg/kg dry wt	09/17/93	CJK	EPA 6010	50
Manganese	34	mg/kg dry wt	09/14/93	CJK	EPA 6010	0.050

Sample ID: Press Sludge Comp., Leach. Lab ID: 9408199-02

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Syn. Pcpt. Leaching Proc.	08/31/93	date extracted		MBR	EPA 1312	
Acid Digestion, Aqueous	09/06/93	date digested		JA	EPA 3010	
Aluminum	0.20	mg/L	09/24/93	CJK	EPA 6010	0.05
Manganese	0.083	mg/L	09/14/93	CJK	EPA 6010	0.001

Note: Composite of samples taken August 23 - 26, 1993.

BDL = Below Detection Limit



WESTERN MICHIGAN
ENVIRONMENTAL SERVICES, INC.

128th Avenue, Holland, Michigan 49424-9263
Phone: 616-399-6070 FAX 616-399-6185

FAX COVER SHEET

Date: 11/03/93

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Company: BITTNER ENGINEERING

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From: TOM BEAMISH

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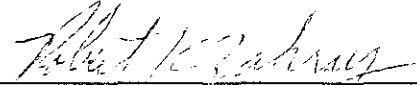
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Tom					

SENT TO: Bittner Engineering, Inc.
113 South 10th Street
Escanaba, Michigan 49829

Attn: Dennis Bittner
Re: Manistique Papers Inc.

DATE: August 20, 1993

ANALYSIS OF: Water Samples

REPORTED BY: 
Robert K. Zahray, Laboratory Manager

DATE RECEIVED: Received from client on August 4, 1993.

Sample ID: R-1

Lab ID: 9308031-01

Collected: 08/02/93

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Alkalinity (as CaCO ₃)	58.0	mg/L	08/09/93	GCB	APHA 2320 B.	2.0
Bicarbonate (as CaCO ₃)	57.5	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Carbonate as CaCO ₃	BDL	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Chemical Oxygen Demand	45	mg/L	08/09/93	WS	EPA 410.4	10
Chloride	1.4	mg/L	08/05/93	MBR	EPA 300.0	0.1
Sulfate	9.8	mg/L	08/05/93	MBR	EPA 300.0	0.1
Total Organic Carbon	16	mg/L	08/05/93	MBR	EPA 9060	1.0
Total Phenols	BDL	mg/L	08/13/93	MBR	EPA 9065	0.005
Acid Digestion, Aqueous	08/05/93	date digested		MBR	EPA 3010	
Calcium	22	mg/L	08/16/93	MBR	EPA 7140	0.02
Copper	BDL	mg/L	08/13/93	WS	EPA 7210	0.02
Iron	2.4	mg/L	08/17/93	MBR	EPA 7380	0.03
Lead	BDL	mg/L	08/10/93	JA	EPA 7421	0.001
Magnesium	5.4	mg/L	08/16/93	MBR	EPA 7450	0.07
Manganese	0.014	mg/L	08/17/93	MBR	EPA 6010	0.001
Sodium	2.9	mg/L	08/16/93	MBR	EPA 7770	0.05
Zinc	0.05	mg/L	08/16/93	JA	EPA 7950	0.01

Sample ID: R-2

Lab ID: 9308031-02

Collected: 08/02/93

T	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Alkalinity (as CaCO ₃)	62.0	mg/L	08/09/93	GCB	APHA 2320 B.	2.0
Bicarbonate (as CaCO ₃)	61.4	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Carbonate as CaCO ₃	BDL	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Chemical Oxygen Demand	49	mg/L	08/09/93	WS	EPA 410.4	10
Chloride	1.4	mg/L	08/05/93	MBR	EPA 300.0	0.1
Sulfate	9.8	mg/L	08/05/93	MBR	EPA 300.0	0.1
Total Organic Carbon	16	mg/L	08/05/93	MBR	EPA 9060	1.0
Total Phenols	BDL	mg/L	08/13/93	MBR	EPA 9065	0.005
Acid Digestion, Aqueous	08/05/93	date digested		MBR	EPA 3010	
Calcium	21	mg/L	08/16/93	MBR	EPA 7140	0.02
Copper	BDL	mg/L	08/13/93	WS	EPA 7210	0.02
Iron	2.6	mg/L	08/17/93	MBR	EPA 7380	0.03
Lead	BDL	mg/L	08/12/93	JA	EPA 7421	0.001
Magnesium	5.2	mg/L	08/16/93	MBR	EPA 7450	0.07
Manganese	0.014	mg/L	08/17/93	MBR	EPA 6010	0.001
Sodium	2.6	mg/L	08/16/93	MBR	EPA 7770	0.05
Zinc	0.04	mg/L	08/16/93	JA	EPA 7950	0.01

Sample ID: R-3

Lab ID: 9308031-03

Collected: 08/02/93

	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Alkalinity (as CaCO ₃)	66.0	mg/L	08/09/93	GCB	APHA 2320 B.	2.0
Bicarbonate (as CaCO ₃)	65.4	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Carbonate as CaCO ₃	BDL	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Chemical Oxygen Demand	46	mg/L	08/09/93	WS	EPA 410.4	10
Chloride	1.4	mg/L	08/05/93	MBR	EPA 300.0	0.1
Sulfate	9.8	mg/L	08/05/93	MBR	EPA 300.0	0.1
Total Organic Carbon	16	mg/L	08/05/93	MBR	EPA 9060	1.0
Total Phenols	BDL	mg/L	08/13/93	MBR	EPA 9065	0.005
Acid Digestion, Aqueous	08/05/93	date digested		MBR	EPA 3010	
Calcium	22	mg/L	08/16/93	MBR	EPA 7140	0.02
Copper	BDL	mg/L	08/13/93	WS	EPA 7210	0.02
Iron	2.8	mg/L	08/17/93	MBR	EPA 7380	0.03
Lead	BDL	mg/L	08/10/93	JA	EPA 7421	0.001
Magnesium	5.3	mg/L	08/16/93	MBR	EPA 7450	0.07
Manganese	0.015	mg/L	08/17/93	MBR	EPA 6010	0.001
Sodium	3.5	mg/L	08/16/93	MBR	EPA 7770	0.05
Zinc	0.04	mg/L	08/16/93	JA	EPA 7950	0.01

Sample ID: G-1

Lab ID: 9308031-04

Collected: 08/02/93

	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Alkalinity (as CaCO ₃)	242	mg/L	08/09/93	GCB	APHA 2320 B.	2.0
Bicarbonate (as CaCO ₃)	235	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Carbonate as CaCO ₃	6.8	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Chemical Oxygen Demand	54	mg/L	08/09/93	WS	EPA 410.4	10
Chloride	9.8	mg/L	08/05/93	MBR	EPA 300.0	0.1
Sulfate	1.0	mg/L	08/05/93	MBR	EPA 300.0	0.1
Total Organic Carbon	20	mg/L	08/05/93	MBR	EPA 9060	1.0
Total Phenols	BDL	mg/L	08/13/93	MBR	EPA 9065	0.005
Acid Digestion, Aqueous	08/05/93	date digested		MBR	EPA 3010	
Calcium	81	mg/L	08/16/93	MBR	EPA 7140	0.02
Copper	BDL	mg/L	08/13/93	WS	EPA 7210	0.02
Iron	0.31	mg/L	08/17/93	MBR	EPA 7380	0.03
Lead	BDL	mg/L	08/10/93	JA	EPA 7421	0.001
Magnesium	32	mg/L	08/16/93	MBR	EPA 7450	0.07
Manganese	0.024	mg/L	08/17/93	MBR	EPA 6010	0.001
Sodium	5.8	mg/L	08/16/93	MBR	EPA 7770	0.05
Zinc	0.04	mg/L	08/16/93	JA	EPA 7950	0.01

Sample ID: W-1

Lab ID: 9308031-05

Collected: 08/02/93

T	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Alkalinity (as CaCO ₃)	142	mg/L	08/09/93	GCB	APHA 2320 B.	2.0
Bicarbonate (as CaCO ₃)	140	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Carbonate as CaCO ₃	2.3	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Chemical Oxygen Demand	130	mg/L	08/09/93	WS	EPA 410.4	10
Chloride	67.7	mg/L	08/10/93	WS	EPA 300.0	0.1
Sulfate	1.4	mg/L	08/05/93	MBR	EPA 300.0	0.1
Total Organic Carbon	19	mg/L	08/05/93	MBR	EPA 9060	1.0
Total Phenols	BDL	mg/L	08/13/93	MBR	EPA 9065	0.005
Acid Digestion, Aqueous	08/05/93	date digested		MBR	EPA 3010	
Calcium	30	mg/L	08/16/93	MBR	EPA 7140	0.02
Copper	BDL	mg/L	08/13/93	WS	EPA 7210	0.02
Iron	10	mg/L	08/17/93	MBR	EPA 7380	0.03
Lead	BDL	mg/L	08/10/93	JA	EPA 7421	0.001
Magnesium	16	mg/L	08/16/93	MBR	EPA 7450	0.07
Manganese	0.33	mg/L	08/17/93	MBR	EPA 6010	0.001
Sodium	38	mg/L	08/16/93	MBR	EPA 7770	0.05
Zinc	0.05	mg/L	08/16/93	JA	EPA 7950	0.01
Liq/Liq Ext. for Acids	08/05/93	prep. date		BC	EPA 3510	
MDNR Scan 8 (Phenols)					EPA 8270	
Phenol	BDL	µg/L	08/06/93	LD		1.0
2-chlorophenol	BDL	µg/L	08/06/93	LD		1.0
2,4-dichlorophenol	BDL	µg/L	08/06/93	LD		1.0
2,4,6-trichlorophenol	BDL	µg/L	08/06/93	LD		1.0
Pentachlorophenol	BDL	µg/L	08/06/93	LD		1.0
4-chloro-3-methylphenol	BDL	µg/L	08/06/93	LD		1.0
2-nitrophenol	BDL	µg/L	08/06/93	LD		1.0
4-nitrophenol	BDL	µg/L	08/06/93	LD		10
2,4-dinitrophenol	BDL	µg/L	08/06/93	LD		10
2-methyl-4,6-dinitrophenol	BDL	µg/L	08/06/93	LD		10
2,4-dimethylphenol	BDL	µg/L	08/06/93	LD		1.0
2,4,5-trichlorophenol	BDL	µg/L	08/06/93	LD		1.0
MDNR Scans 1&2					EPA 8240	
Bromodichloromethane	BDL	µg/L	08/05/93	HL		1.0
Bromoform	BDL	µg/L	08/05/93	HL		1.0
Carbon Tetrachloride	BDL	µg/L	08/05/93	HL		1.0
Chlorobenzene	BDL	µg/L	08/05/93	HL		1.0
Chlorodibromomethane	BDL	µg/L	08/05/93	HL		1.0
Chloroform	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
cis-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
trans-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloropropane	BDL	µg/L	08/05/93	HL		1.0
1,3-dichloropropene	BDL	µg/L	08/05/93	HL		1.0
Methylene Chloride	BDL	µg/L	08/05/93	HL		5.0
1,1,2,2-Tetrachloroethane	BDL	µg/L	08/05/93	HL		1.0
Tetrachloroethene	BDL	µg/L	08/05/93	HL		1.0
1,1,1-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1,2-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
Trichloroethene	BDL	µg/L	08/05/93	HL		1.0
Benzene	BDL	µg/L	08/05/93	HL		1.0
Ethyl Benzene	BDL	µg/L	08/05/93	HL		1.0
Toluene	BDL	µg/L	08/05/93	HL		1.0
Styrene	BDL	µg/L	08/05/93	HL		1.0
Xylene Isomers	BDL	µg/L	08/05/93	HL		1.0

Sample ID: W-2

Lab ID: 9308031-06

Collected: 08/02/93

	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Alkalinity (as CaCO ₃)	340	mg/L	08/09/93	GCB	APHA 2320 B.	2.0
Bicarbonate (as CaCO ₃)	330	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Carbonate as CaCO ₃	9.8	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Chemical Oxygen Demand	100	mg/L	08/09/93	WS	EPA 410.4	10
Chloride	5.4	mg/L	08/05/93	MBR	EPA 300.0	0.1
Sulfate	0.16	mg/L	08/05/93	MBR	EPA 300.0	0.1
Total Organic Carbon	17	mg/L	08/06/93	MBR	EPA 9060	1.0
Total Phenols	BDL	mg/L	08/13/93	MBR	EPA 9065	0.005
Acid Digestion, Aqueous	08/05/93	date digested		MBR	EPA 3010	
Calcium	88	mg/L	08/16/93	MBR	EPA 7140	0.02
Copper	0.03	mg/L	08/13/93	WS	EPA 7210	0.02
Iron	3.3	mg/L	08/17/93	MBR	EPA 7380	0.03
Lead	BDL	mg/L	08/10/93	JA	EPA 7421	0.001
Magnesium	28	mg/L	08/16/93	MBR	EPA 7450	0.07
Manganese	0.24	mg/L	08/17/93	MBR	EPA 6010	0.001
Sodium	6.6	mg/L	08/16/93	MBR	EPA 7770	0.05
Zinc	0.05	mg/L	08/16/93	JA	EPA 7950	0.01
Liq/Liq Ext. for Acids	08/05/93	prep. date		BC	EPA 3510	
MDNR Scan 8 (Phenols)					EPA 8270	
Phenol	BDL	µg/L	08/06/93	LD		1.1
2-chlorophenol	BDL	µg/L	08/06/93	LD		1.1
2,4-dichlorophenol	BDL	µg/L	08/06/93	LD		1.1
2,4,6-trichlorophenol	BDL	µg/L	08/06/93	LD		1.1
Pentachlorophenol	BDL	µg/L	08/06/93	LD		1.1
4-chloro-3-methylphenol	BDL	µg/L	08/06/93	LD		1.1
2-nitrophenol	BDL	µg/L	08/06/93	LD		1.1
4-nitrophenol	BDL	µg/L	08/06/93	LD		11
2,4-dinitrophenol	BDL	µg/L	08/06/93	LD		11
2-methyl-4,6-dinitrophenol	BDL	µg/L	08/06/93	LD		11
2,4-dimethylphenol	BDL	µg/L	08/06/93	LD		2.0
2,4,5-trichlorophenol	BDL	µg/L	08/06/93	LD		1.1
MDNR Scans 1&2					EPA 8240	
Bromodichloromethane	BDL	µg/L	08/05/93	HL		1.0
Bromoform	BDL	µg/L	08/05/93	HL		1.0
Carbon Tetrachloride	BDL	µg/L	08/05/93	HL		1.0
Chlorobenzene	BDL	µg/L	08/05/93	HL		1.0
Chlorodibromomethane	BDL	µg/L	08/05/93	HL		1.0
Chloroform	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
cis-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
trans-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloropropane	BDL	µg/L	08/05/93	HL		1.0
1,3-dichloropropene	BDL	µg/L	08/05/93	HL		1.0
Methylene Chloride	BDL	µg/L	08/05/93	HL		5.0
1,1,2,2-Tetrachloroethane	BDL	µg/L	08/05/93	HL		1.0
Tetrachloroethene	BDL	µg/L	08/05/93	HL		1.0
1,1,1-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1,2-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
Trichloroethene	BDL	µg/L	08/05/93	HL		1.0
Benzene	BDL	µg/L	08/05/93	HL		1.0
Ethyl Benzene	BDL	µg/L	08/05/93	HL		1.0
Toluene	BDL	µg/L	08/05/93	HL		1.0
Styrene	BDL	µg/L	08/05/93	HL		1.0
Xylene Isomers	BDL	µg/L	08/05/93	HL		1.0

Sample ID: W-4

Lab ID: 9308031-07

Collected: 08/02/93

T	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Alkalinity (as CaCO ₃)	132	mg/L	08/09/93	GCB	APHA 2320 B.	2.0
Bicarbonate (as CaCO ₃)	130	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Carbonate as CaCO ₃	2.3	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Chemical Oxygen Demand	20	mg/L	08/09/93	WS	EPA 410.4	10
Chloride	0.46	mg/L	08/05/93	MBR	EPA 300.0	0.1
Sulfate	0.14	mg/L	08/05/93	MBR	EPA 300.0	0.1
Total Organic Carbon	12	mg/L	08/06/93	MBR	EPA 9060	1.0
Total Phenols	BDL	mg/L	08/13/93	MBR	EPA 9065	0.005
Acid Digestion, Aqueous	08/05/93	date digested		MBR	EPA 3010	
Calcium	30	mg/L	08/16/93	MBR	EPA 7140	0.02
Copper	BDL	mg/L	08/13/93	WS	EPA 7210	0.02
Iron	3.0	mg/L	08/17/93	MBR	EPA 7380	0.03
Lead	BDL	mg/L	08/10/93	JA	EPA 7421	0.001
Magnesium	11	mg/L	08/16/93	MBR	EPA 7450	0.07
Manganese	0.14	mg/L	08/17/93	MBR	EPA 6010	0.001
Sodium	2.4	mg/L	08/16/93	MBR	EPA 7770	0.05
Zinc	0.05	mg/L	08/16/93	JA	EPA 7950	0.01
Liq/Liq Ext. for Acids	08/05/93	prep. date		BC	EPA 3510	
MDNR Scan 8 (Phenols)					EPA 8270	
Phenol	BDL	µg/L	08/06/93	LD		1.1
2-chlorophenol	BDL	µg/L	08/06/93	LD		1.1
2,4-dichlorophenol	BDL	µg/L	08/06/93	LD		1.1
2,4,6-trichlorophenol	BDL	µg/L	08/06/93	LD		1.1
Pentachlorophenol	BDL	µg/L	08/06/93	LD		1.1
4-chloro-3-methylphenol	BDL	µg/L	08/06/93	LD		1.1
2-nitrophenol	BDL	µg/L	08/06/93	LD		1.1
4-nitrophenol	BDL	µg/L	08/06/93	LD		11
2,4-dinitrophenol	BDL	µg/L	08/06/93	LD		11
2-methyl-4,6-dinitrophenol	BDL	µg/L	08/06/93	LD		11
2,4-dimethylphenol	BDL	µg/L	08/06/93	LD		1.1
2,4,5-trichlorophenol	BDL	µg/L	08/06/93	LD		1.1
MDNR Scans 1&2					EPA 8240	
Bromodichloromethane	BDL	µg/L	08/05/93	HL		1.0
Bromoform	BDL	µg/L	08/05/93	HL		1.0
Carbon Tetrachloride	BDL	µg/L	08/05/93	HL		1.0
Chlorobenzene	BDL	µg/L	08/05/93	HL		1.0
Chlorodibromomethane	BDL	µg/L	08/05/93	HL		1.0
Chloroform	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
cis-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
trans-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloropropane	BDL	µg/L	08/05/93	HL		1.0
1,3-dichloropropene	BDL	µg/L	08/05/93	HL		1.0
Methylene Chloride	BDL	µg/L	08/05/93	HL		5.0
1,1,2,2-Tetrachloroethane	BDL	µg/L	08/05/93	HL		1.0
Tetrachloroethene	BDL	µg/L	08/05/93	HL		1.0
1,1,1-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1,2-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
Trichloroethene	BDL	µg/L	08/05/93	HL		1.0
Benzene	BDL	µg/L	08/05/93	HL		1.0
Ethyl Benzene	BDL	µg/L	08/05/93	HL		1.0
Toluene	BDL	µg/L	08/05/93	HL		1.0
Styrene	BDL	µg/L	08/05/93	HL		1.0
Xylene Isomers	BDL	µg/L	08/05/93	HL		1.0

Sample ID: W-7

Lab ID: 9308031-08

Collected: 08/02/93

	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Alkalinity (as CaCO ₃)	588	mg/L	08/09/93	GCB	APHA 2320 B.	2.0
Bicarbonate (as CaCO ₃)	586	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Carbonate as CaCO ₃	BDL	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Chemical Oxygen Demand	150	mg/L	08/10/93	WS	EPA 410.4	10
Chloride	34.2	mg/L	08/10/93	WS	EPA 300.0	0.1
Sulfate	0.20	mg/L	08/05/93	MBR	EPA 300.0	0.1
Total Organic Carbon	63	mg/L	08/06/93	MBR	EPA 9060	1.0
Total Phenols	BDL	mg/L	08/13/93	MBR	EPA 9065	0.005
Acid Digestion, Aqueous	08/05/93	date digested		MBR	EPA 3010	
Calcium	150	mg/L	08/16/93	MBR	EPA 7140	0.02
Copper	BDL	mg/L	08/13/93	WS	EPA 7210	0.02
Iron	20	mg/L	08/17/93	MBR	EPA 7380	0.03
Lead	BDL	mg/L	08/10/93	JA	EPA 7421	0.001
Magnesium	48	mg/L	08/16/93	MBR	EPA 7450	0.07
Manganese	2.4	mg/L	08/17/93	MBR	EPA 6010	0.001
Sodium	29	mg/L	08/16/93	MBR	EPA 7770	0.05
Zinc	0.06	mg/L	08/16/93	JA	EPA 7950	0.01
Liq/Liq Ext. for Acids	08/05/93	prep. date		BC	EPA 3510	
MDNR Scan 8 (Phenols)					EPA 8270	
Phenol	BDL	µg/L	08/06/93	LD		1.1
2-chlorophenol	BDL	µg/L	08/06/93	LD		1.1
2,4-dichlorophenol	BDL	µg/L	08/06/93	LD		1.1
2,4,6-trichlorophenol	BDL	µg/L	08/06/93	LD		1.1
Pentachlorophenol	BDL	µg/L	08/06/93	LD		1.1
4-chloro-3-methylphenol	BDL	µg/L	08/06/93	LD		1.1
2-nitrophenol	BDL	µg/L	08/06/93	LD		1.1
4-nitrophenol	BDL	µg/L	08/06/93	LD		1.1
2,4-dinitrophenol	BDL	µg/L	08/06/93	LD		1.1
2-methyl-4,6-dinitrophenol	BDL	µg/L	08/06/93	LD		1.1
2,4-dimethylphenol	BDL	µg/L	08/06/93	LD		1.1
2,4,5-trichlorophenol	BDL	µg/L	08/06/93	LD		1.1
MDNR Scans 1&2					EPA 8240	
Bromodichloromethane	BDL	µg/L	08/05/93	HL		1.0
Bromoform	BDL	µg/L	08/05/93	HL		1.0
Carbon Tetrachloride	BDL	µg/L	08/05/93	HL		1.0
Chlorobenzene	BDL	µg/L	08/05/93	HL		1.0
Chlorodibromomethane	BDL	µg/L	08/05/93	HL		1.0
Chloroform	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
cis-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
trans-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloropropane	BDL	µg/L	08/05/93	HL		1.0
1,3-dichloropropene	BDL	µg/L	08/05/93	HL		1.0
Methylene Chloride	BDL	µg/L	08/05/93	HL		5.0
1,1,2,2-Tetrachloroethane	BDL	µg/L	08/05/93	HL		1.0
Tetrachloroethene	BDL	µg/L	08/05/93	HL		1.0
1,1,1-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1,2-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
Trichloroethene	BDL	µg/L	08/05/93	HL		1.0
Benzene	BDL	µg/L	08/05/93	HL		1.0
Ethyl Benzene	BDL	µg/L	08/05/93	HL		1.0
Toluene	BDL	µg/L	08/05/93	HL		1.0
Styrene	BDL	µg/L	08/05/93	HL		1.0
Xylene Isomers	BDL	µg/L	08/05/93	HL		1.0

Sample ID: W-8

Lab ID: 9308031-09

Collected: 08/02/93

	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
Alkalinity (as CaCO ₃)	224	mg/L	08/09/93	GCB	APHA 2320 B.	2.0
Bicarbonate (as CaCO ₃)	220	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Carbonate as CaCO ₃	4.1	mg/L	08/09/93	GCB	APHA4500-CO ₂	2.0
Chemical Oxygen Demand	140	mg/L	08/09/93	WS	EPA 410.4	10
Chloride	12.1	mg/L	08/10/93	WS	EPA 300.0	0.1
Sulfate	0.50	mg/L	08/05/93	MBR	EPA 300.0	0.1
Total Organic Carbon	35	mg/L	08/06/93	MBR	EPA 9060	1.0
Total Phenols	BDL	mg/L	08/13/93	MBR	EPA 9065	0.005
Acid Digestion, Aqueous	08/05/93	date digested		MBR	EPA 3010	
Calcium	52	mg/L	08/16/93	MBR	EPA 7140	0.02
Copper	BDL	mg/L	08/13/93	WS	EPA 7210	0.02
Iron	20	mg/L	08/17/93	MBR	EPA 7380	0.03
Lead	BDL	mg/L	08/10/93	JA	EPA 7421	0.001
Magnesium	21	mg/L	08/16/93	MBR	EPA 7450	0.07
Manganese	0.40	mg/L	08/17/93	MBR	EPA 6010	0.001
Sodium	10	mg/L	08/16/93	MBR	EPA 7770	0.05
Zinc	0.05	mg/L	08/16/93	JA	EPA 7950	0.01
Liq/Liq Ext. for Acids	08/05/93	prep. date		BC	EPA 3510	
MDNR Scan 8 (Phenols)					EPA 8270	
Phenol	BDL	µg/L	08/06/93	LD		1.1
2-chlorophenol	BDL	µg/L	08/06/93	LD		1.1
2,4-dichlorophenol	BDL	µg/L	08/06/93	LD		1.1
2,4,6-trichlorophenol	BDL	µg/L	08/06/93	LD		1.1
Pentachlorophenol	BDL	µg/L	08/06/93	LD		1.1
4-chloro-3-methylphenol	BDL	µg/L	08/06/93	LD		1.1
2-nitrophenol	BDL	µg/L	08/06/93	LD		1.1
4-nitrophenol	BDL	µg/L	08/06/93	LD		11
2,4-dinitrophenol	BDL	µg/L	08/06/93	LD		11
2-methyl-4,6-dinitrophenol	BDL	µg/L	08/06/93	LD		11
2,4-dimethylphenol	BDL	µg/L	08/06/93	LD		1.1
2,4,5-trichlorophenol	BDL	µg/L	08/06/93	LD		1.1
MDNR Scans 1&2					EPA 8240	
Bromodichloromethane	BDL	µg/L	08/05/93	HL		1.0
Bromoform	BDL	µg/L	08/05/93	HL		1.0
Carbon Tetrachloride	BDL	µg/L	08/05/93	HL		1.0
Chlorobenzene	BDL	µg/L	08/05/93	HL		1.0
Chlorodibromomethane	BDL	µg/L	08/05/93	HL		1.0
Chloroform	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
cis-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
trans-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloropropane	BDL	µg/L	08/05/93	HL		1.0
1,3-dichloropropene	BDL	µg/L	08/05/93	HL		1.0
Methylene Chloride	BDL	µg/L	08/05/93	HL		5.0
1,1,2,2-Tetrachloroethane	BDL	µg/L	08/05/93	HL		1.0
Tetrachloroethene	BDL	µg/L	08/05/93	HL		1.0
1,1,1-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1,2-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
Trichloroethene	BDL	µg/L	08/05/93	HL		1.0
Benzene	BDL	µg/L	08/05/93	HL		1.0
Ethyl Benzene	BDL	µg/L	08/05/93	HL		1.0
Toluene	BDL	µg/L	08/05/93	HL		1.0
Styrene	BDL	µg/L	08/05/93	HL		1.0
Xylene Isomers	BDL	µg/L	08/05/93	HL		1.0

Sample ID: Trip Blank

Lab ID: 9308031-10

Collected: 06/30/93

	RESULT	UNITS	ANALYZED	BY	METHOD	MDL
MDNR Scans 1&2					EPA 8240	
Bromodichloromethane	BDL	µg/L	08/05/93	HL		1.0
Bromoform	BDL	µg/L	08/05/93	HL		1.0
Carbon Tetrachloride	BDL	µg/L	08/05/93	HL		1.0
Chlorobenzene	BDL	µg/L	08/05/93	HL		1.0
Chlorodibromomethane	BDL	µg/L	08/05/93	HL		1.0
Chloroform	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
cis-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
trans-1,2-dichloroethene	BDL	µg/L	08/05/93	HL		1.0
1,2-dichloropropane	BDL	µg/L	08/05/93	HL		1.0
1,3-dichloropropene	BDL	µg/L	08/05/93	HL		1.0
Methylene Chloride	BDL	µg/L	08/05/93	HL		5.0
1,1,2,2-Tetrachloroethane	BDL	µg/L	08/05/93	HL		1.0
Tetrachloroethene	BDL	µg/L	08/05/93	HL		1.0
1,1,1-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
1,1,2-trichloroethane	BDL	µg/L	08/05/93	HL		1.0
Trichloroethene	BDL	µg/L	08/05/93	HL		1.0
Benzene	BDL	µg/L	08/05/93	HL		1.0
Ethyl Benzene	BDL	µg/L	08/05/93	HL		1.0
Toluene	BDL	µg/L	08/05/93	HL		1.0
Styrene	BDL	µg/L	08/05/93	HL		1.0
Xylene Isomers	BDL	µg/L	08/05/93	HL		1.0



3352 1st Avenue, Holland, Michigan 49424-9263
Phone: 616-399-6070 FAX: 616-399-6185

CLIENT SAMPLE -- CHAIN OF CUSTODY FORM

Project Name:	MANISTIQUE PAPERS INC.
Name of Sampler:	LAFFI YOUGH - MGR STANNARD - GITTNER ENGR. INC.

[illegible]

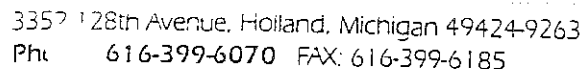
Remarks: Note: Please Bill MANISTIQUE PAPERS INC. DIRECTLY - SEND RESULTS TO RITTNER ENGINEERING INC. 113 SO. 10TH STREET ESCANABA, MI 49829

Samples Relinquished By: <i>Larry Hough</i>	Samples Transported By: <i>U.P.S.</i>	Samples Received By: <i>P.J. Walker</i>
Affiliation: <i>Hydro. Tech</i>	Affiliation:	Affiliation: <i>Wmes I</i>
Date: <i>8-3-93</i> Time: <i>1400</i>	Date:	Date: <i>8/4/93</i> Time: <i>1000</i>

SAMPLE MATRIX CODES:

W = Water
GW = Groundwater
SW = Surface Water
WW = Wastewater

WST = Waste
S = Soil
O = Other



1

CLIENT:	Bitter Eng - Monistigue Paper	ESI #:	9308031
RECEIVED BY:	PJL	DATE:	8/4/93

[illegible]

Condition of Icepacks: Fully Frozen Partially Frozen X Thawed NA

Comments: 113601, 1019341, 1030607

<u>Sample Matrices</u>	<u>Bottle Sizes</u>	<u>Bottle Types</u>	<u>Bottle Fullness</u>	<u>Preservation</u>
W = Water	L = Liter	P = Plastic	N = No Head Room	A = pH < 2
WW = Wastewater	5 = 500 ml	A = Amber Glass	F = Full	B = pH > 12
GW = Groundwater	2 = 250 ml	G = Clear Glass	P = Partial	C = Na ₂ S ₂ O ₃
SW = Surfacewater	1 = 125 ml	B = Bottle		D = None
S = Soil	6 = 60 ml	W = Wide-Mouth Jar		
SL = Sludge	V = 44 ml	M = Medium-Mouth Jar		
WT = Waste		S = Small-Mouth Jar		
Oil		C = Cullert		
Blank		O = VOA Vial		
		T = Tall		
		P = Short		

MICHIG. DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

April 24, 1993

TO: Robert Schmeling II, Regional Supervisor, Waste Management Division

FROM: Duane Roskoskey, Waste Characterization Unit, Waste Management Division

SUBJECT: Manistique Papers Waste Characterization

Staff have completed their review of analytical data submitted to our office by Dennis Bittner, Bittner Engineering, Inc., for the coal ashes and paper mill sludge generated at Manistique Papers, Inc (copy attached). We are unable to characterize either waste stream as inert (uncontaminated) pursuant to the Solid Waste Management Act, 1978 P.A. 641, as amended, based on the results of the analytical testing. A number of parameters are elevated above the Type B criteria developed pursuant to the Michigan Environmental Response Act, 1982 P.A. 307, as amended, which we have adopted as our guidelines for designating a material as inert. Following is a list of the 95% Upper Confidence Levels' (UCL 95), which are based on the number of samples and the variation of the sample results, of the parameters that exceed the Type B criteria (results are leachable concentrations of contaminants using Synthetic Precipitation Leach Procedure [SPLP]):

<u>Waste Stream</u>	<u>Parameter</u>	<u>Results</u>	<u>Type B Criteria</u>
Coal Ashes	Aluminum	1400 ug/l	50 ug/l
	Arsenic	46.2 ug/l	1.0 ug/l
	Arsenic*	10.7 mg/kg	5.8 mg/kg
	Iron	312 ug/l	300 ug/l
Sludge	Aluminum	564 ug/l	50 ug/l
	Arsenic	1.3 ug/l	1.0 ug/l
	Manganese	120 ug/l	50 ug/l

* total concentration of arsenic

Based on the results of the analytical data, both waste streams could be disposed in a licensed Type II landfill or an upgraded Type III facility that contains a liner and leachate collection system. Any groundwater monitoring protocol at the current disposal site should include volatile organic compounds and phenolics (both were present below the Type B criteria) in addition to those listed above. If you have any questions concerning the above results or recommendations, I can be reached at 517-335-4712.

Attachment

cc: Jack Rydquist, SWQD, Marquette
Frank Baldwin, SWQD
Joan Peck, WMD
John Craig, WMD

STATE OF MICHIGAN



NATURAL RESOURCES COMMISSION

THOMAS J. ANDERSON
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JOD A. MATTSON
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RAYMOND POUPORE

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

November 28, 1989

RECEIVED

DEC -1 1989

Marquette Dist. W.M.D.

Mr. Dennis B. Bittner, P.E.
Bittner Engineering, Inc.
614 Ludington Street
Escanaba, MI 49829

Dear Mr. Bittner:

I have recently completed by review of the May 3, 1989 proposal that your firm submitted for a waste characterization study for Manistique Papers.

The study should be completed with the following modifications:

1. All materials, including the miscellaneous wood and paper wastes, must be representatively sampled and analyzed for waste characterization.
2. In order to representatively sample a variable waste stream, a minimum of four discrete samples must be analyzed. A composite of five daily samples (as proposed) will represent one sample. This practice should be performed a minimum of four times providing at least four discrete samples per waste.
3. Testing need not include ASTM leachate analysis. Please see comments 4 and 5 for specific requirements. Any additional organics that could be present in the waste must be analyzed by TCLP methodology.
4. The dewatered sludge must be analyzed for the following parameters (note detection limits):

-TCLP extraction of the waste followed by analysis using EPA Methods 601/602.

-TCLP or EP toxic extraction of the waste followed by analysis for the following metals:

<u>Parameter</u>	<u>Detection Limit (mg/l)</u>	<u>Parameter</u>	<u>Detection Limit (mg/l)</u>
Aluminum	0.05	Lead	0.001
Arsenic	0.005	Mercury	0.0004
Barium	0.200	Nickel	0.028
Cadmium	0.002	Selenium	0.002
Chromium	0.01	Silver	0.01
Copper	0.2	Zinc	0.3
Iron	0.300	Manganese	0.05

-Total (compositional) analysis for PCB's, sulfides, TOC, 601/602 volatiles and the above listed metals.

-TCLP extraction followed by analysis for total phenols and pH.

5. The fly ash and bottom ash must be analyzed for the following parameters:

-TCLP extraction of the waste followed by analysis using EPA methods 601/602.

-TCLP or EP toxic extraction of the waste followed by analysis for the following metals:

<u>Parameter</u>	<u>Detection Limit (mg/l)</u>	<u>Parameter</u>	<u>Detection Limit (mg/l)</u>
Arsenic	0.005	Lead	0.001
Barium	0.200	Mercury	0.0004
Cadmium	0.002	Selenium	0.002
Chromium	0.01	Silver	0.01
Copper	0.2	Zinc	0.3

-Total (compositional) analysis for 601/602 volatiles and the above listed metals.

-TCLP or EP toxic extraction of the waste followed by analysis for:

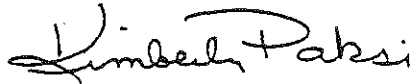
- gross alpha particle activity
- radium-226 if gross alpha analysis is greater than 5 pci/liter
- radium-228 if radium-226 analysis is greater than 3 pci/liter

Mr. Dennis B. Bittner
Page 3
November 28, 1989

6. The final report must describe the following:
- containers and preservatives used during sampling
 - sampling devices and methods used to collect the samples
 - handling and chain-of-custody procedures for the samples
 - recordkeeping procedures to show the sampling program is followed
 - a list of persons performing the sampling and analysis
7. If it is felt that certain analyses are not necessary to adequately characterize a specific waste stream, justification must be submitted with the final report.

If you have any further questions, please contact me at 517-373-7895.

Sincerely,



Kimberly Paksi
Waste Characterization Unit
Waste Management Division

cc: Rob Schmeling
Manistique Paper File

Cust. No: 151

CORY LABORATORIES, INC.
823 5th St.
MENOMINEE, MICH.

P.O. No: _____

SAMPLE ANALYSIS SUMMARY

SAMPLE DESCRIPTION:

151-24-923: Swamp Sample #1, T. 9-23-79 - *Base of Pile (west)*
 151-25-923: Swamp Sample #2, T. 9-23-79 - *400' west of Pile*
 151-26-923: Swamp Sample #3, T. 9-23-79 - *1 mile North of Pile*
 151-27-923: Sludge Cake, Sample #4, T. 9-23-79 -
 151-006-923: 006 Grab, Sample #5, T. 9-23-79 - *our outfall to River*



TEST RUN	24-923	25-923	26-923	27-923 *	006-923
Antimony, mg/l	<0.5	<0.5	<0.5	<20	0.7
Inorganic Arsenic, mg/l	<0.007	<0.007	<0.007	0.65	<0.007
Beryllium, mg/l	<0.05	<0.05	<0.05	1.9	<0.05
Cadmium, mg/l	0.042	0.088	0.023	3.2	0.054
Cobalt, mg/l ✓	0.20	0.34	0.13	<2.2 ✓	0.10 ✓
Copper, mg/l ✓	<0.030	<0.030	<0.030	110 ✓	<0.030 ✓
Lead, mg/l ✓	0.082	0.032	<0.020	98 ✓	0.027 ✓
Manganese, mg/l	3.0	4.5	0.11	15	0.44
Mercury, mg/l ✓	<0.0005	<0.0005	<0.0005	<0.03 ✓	<0.0005
Molybdenum, mg/l	<0.2	<0.2	<0.2	11	<0.2
Nickel, mg/l ✓	0.23	0.25	0.22	29 ✓	0.32 ✓
Selenium, mg/l	0.014	<0.005	<0.005	13	<0.005
Silver, mg/l	<0.020	<0.020	<0.020	<1.5	<0.020
Thallium, mg/l	<0.3	<0.4	<0.4	<20	<0.4
Zinc, mg/l ✓	3.2	<0.030	<0.030	81 ✓	0.22 ✓

COMMENTS:

Sample Received: 9-26-79

* Results reported as ppm dry basis.

DATE: NOV 15 1979ANALYST: Edward M. Pruthe

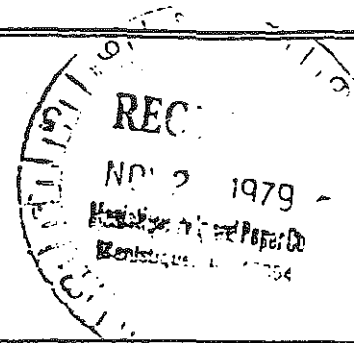
ANALYST: Donald W. Baetjer

Cust. No: 151CORY LABORATORIES, INC.
823 5th St.
MENOMINEE, MICH.

P.O. No: _____

SAMPLE ANALYSIS SUMMARY

SAMPLE DESCRIPTION:

151-28-1014: Sample # 6, Taken 10-14-79 *Ground Sample*
West Boundary Line 200' North
of Frankovich Road~~as received~~

TEST RUN	28-1014 *				
Antimony, ppm	<0.7				
Inorganic Arsenic, ppm	0.038				
Beryllium, ppm	<0.07				
Cadmium, ppm	<0.07				
Cobalt, ppm	0.38				
Copper, ppm	1.9				
Lead, ppm	0.56				
Manganese, ppm	5.8				
Mercury, ppm	0.020				
Molybdenum, ppm	<0.7				
Nickel, ppm	0.45				
Selenium, ppm	0.17				
Silver, ppm	<0.15				
Zinc, ppm	1.0				
Thallium, ppm	<2.0				

COMMENTS:

Sample Received: 10-16-79 * Results reported as ppm dry basis.DATE: NOV 18 1979ANALYST: *Edward D. Buttle*

CORY LABORATORIES, INC.

823 5TH STREET • MENOMINEE, MICHIGAN 49858 • (906) 863-9336

JAN 15 1979
Menominee, MI 49858
Menominee, MI 49858

LANDFILL SLUDGE REPORT

MANISTIQUE PULP & PAPER CO.

SUBMITTED BY:

CORY LABORATORIES, INC
Menominee, MI 49858
Jan 15, 1979

LANDFILL SLUDGE REPORT

This report summarizes analytical data concerning the content and leachability of typical sludge from the Manistique Pulp and Paper Co. which is disposed of to a landfill site.

The purpose of the report is to present the analytical data and conclusions relative to the chemical content of the sludge and compounds/elements that can leach from the material.

DESCRIPTION AND GENERAL PHYSICAL PARAMETER

The sludge is a grey color with a mild musty type odor. The general physical parameters are by analysis.

- (1) Water 75%
- (2) Clays, soils and other noncombustibles 16%
- (3) Paper fibers 9%
- (4) pH 5.1 - 5.9

PROCEDURE

On two occasions, once in March 1977 and again in June 1977, samples of typical sludge for disposal were submitted for analysis. They were identified as follows.

151-28-327 Mill Sludge March 77
151-29-609 Mill Sludge June 77

Each sample was analyzed in accordance with methods prescribed in Table I, List of Approved Test Procedures, 40 CFR Part 136, Analysis of Pollutants, June 9, 1975 and the data results summarized in Table I. In some cases, parameters in the second sample were not run since it was not deemed necessary to repeat the analysis.

Of the tested parameters, the following were in excess of 200 ppm and of a relatively non-toxic nature.

	<u>Value in ppm</u>
Kjeldahl N	640-690
Silicon	16,400 ppm
Phosphorus	250-260
Aluminum	25,200-31,200
Titanium	2,500

Of the parameters analyzed, the following are values of the more toxic materials that were deemed present in sufficient quantity to be set-out separately:

	<u>Value in ppm</u>
Chromium, Total	21
Nickel	4
Copper	30
Lead	39
Zinc	20

Sample 151-29-609 was subjected to leaching studies and the results shown in Table 2. Examination of the leaching data indicates that the material has no tendency to leach any parameter tested to a degree that would cause concern. We attribute this to low solubility and the chelating characteristics associated with clays. Clays are an expected content of this sludge.

The results shown here were examined against typical paper mill sludges and no abnormalities were noted.

The procedure for the leaching study is shown in the appendix.

CONCLUSION:

The material for disposal does not appear to be a hazard or concern to cause a deterioration of groundwater and its physical characteristics do not appear to be a social-esthetic problem from the odor point of view, transportation, etc. Final covering with earth would seem in order due to color.

TABLE 1

DATA RELATED DETERMINATION OF SLUDGE CONTENT

(All Values PPM Unless Otherwise Noted)

<u>PARAMETER</u>	<u>(151-28-327)</u> <u>MILL SLUDGE</u>	<u>(151-29-609)</u> <u>MILL SLUDGE</u>	<u>(151-38-1002)</u> <u>SITE FILL</u>
Kjeldahl Nit.	690	640	---
Potassium	170	240	170
Silicon	16,400	---	---
Phosphorus	260	250	127
Benzine ✓	1.0	<2	---
Ash	10.9	12.6	16%
Ash (dry basis)	---	---	55%
Moisture %	76.6	73.8	---
T. Vol. Solids %	53.4	52.0	---
Toluene	1.0	<2	---
Manganese	2.7	6.5	<0.030
Molybdenum	19	---	<4.0
Vanadium	---	11	---
Iron	590	68	---
Tungston	95	---	---
Columbium	72	---	---
Cobalt	1.6	2.6	<0.5
Aluminum	25,200	31,200	31,000
Magnesium	15	39	110
Titanium	2,500	---	---
Bismuth	14	---	---
Boron	0.36	0.65	---
Calcium	<1	1.9	---
Zirconium	190	---	---
Chloride	11	13	---
Antimony	<10	---	---
Chromium ✓	21	26	110
Nickel	4	15	<0.05
Copper	30	25	4.8
Tin	34	---	<20
Lead	39	95	116
Arsenic ✓	0.17	0.12	0.28
Zinc	20	38	1.4
Barium	14	---	---
Mercury	---	---	<0.001
pH	---	---	5.4
Total Solids	---	---	29%
Ash (as received)	---	---	16%
Ash (dry basis)	---	---	55%

Methods of Analysis in Accordance with Table I, List of Approved Test Procedures,
40 CFR, Part 136, Analysis of Pollutants, June 9, 1975.

TABLE 2

DATA RELATED TO MATERIAL THAT CAN LEACH FROM SLUDGE

(All Values In mg/l Unless Otherwise Indicated)

<u>PARAMETER</u>	<u>(151-129A-1002)</u> <u>FIRST</u> <u>LEACHATE</u>	<u>(151-129B-1002)</u> <u>SECOND</u> <u>LEACHATE</u>	<u>(151-129C-1002)</u> <u>THIRD</u> <u>LEACHATE</u>
Total Chrome	<0.025	<0.025	<0.025
pH, units	4.0	5.9	5.6
Aluminum	0.57	<0.01	<0.01
Copper	0.043	<0.030	<0.030
Nickel	0.21	<0.05	<0.05
Lead	<0.020	<0.020	<0.020
Mercury	<0.002	<0.002	<0.002
Phosphorus	0.87	0.96	0.39
Zinc	0.089	0.053	0.038
Kjeldahl Nit.	5.3	0.69	1.1
Potassium	3.8	0.54	0.33
Silicon	17	1.4	2.0
Manganese	0.76	0.031	0.047
Molybdenum	<0.2	<0.2	<0.2
Vanadium	<0.1	<0.1	<0.1
Iron	17	0.94	0.58
Tungston	7	<4	<4
Columbium	6	2	<2
Cobalt	<0.030	<0.030	<0.030
Antimony	<0.2	<0.2	<0.2
Cyanide	<0.005	<0.005	<0.005
COD	708	18	29
Tin	0.8	0.7	0.4
Magnesium	4.4	0.17	0.13
Titanium	<0.2	<0.2	<0.2
Arsenic	<0.005	<0.005	<0.005
Bismuth	<0.10	<0.10	<0.10
Boron	0.077	<0.050	<0.050
Barium	2.5	<0.5	<0.5
Calcium	35	2.9	1.9
Zirconium	<2	<2	<2
Chloride	3	2	9
Mercury	*		

Methods of Analysis in Accordance with Table I, List of Approved Test Procedures, 40 CFR, Part 136, Analysis of Pollutants, June 9, 1975.

*Reference Manistique Pulp & Paper Data indicating approx. 30 ppB Hg with non-detectable (<0.001) in Leachates.

APPENDIX

LEACHING STUDY PROCEDURE

The sludge sample was treated according to a standardized test procedure used and recommended by the Wisconsin DNR - Solid Wastes which is being used to determine matter release from fill materials and is referred to as the "Shake Flask" method. A brief outline of the procedure is given below:

1. Mix sludge well to obtain homogenous sample.
2. Duplicate 350 g. samples of sludge in 1400 ml. of pH 7.0 deionized water are prepared.
3. Samples of sludge and water are shaken twice daily for 15 seconds.
4. At the end of 24 hours, decant the samples through 0.45 membrane filters and wash each sludge layer with 350 ml. of pH 7.0 deionized water and decant washings to filter. Combine duplicates to give 3500 ml. of filtered sample for analysis.
5. Place filter and sludge back into original containers and add 1400 ml. of pH 7.0 deionized water. Shake for 15 seconds twice daily for three days. After 72 hours, membrane filter and wash each as before and combine to make a second 3500 ml. sample for analysis.
6. Repeat (5) except shake for 15 seconds twice daily for 6 days. After 154 hours, membrane filter and wash as before and combine to make a third 3500 ml. sample for analysis.
7. Filtrates are analysed separately for each parameter in accordance with Table I List of Approved Test Procedures, 40 CFR Part 136 Analysis of Pollutants, June 9, 1975.

SUBURBAN LABORATORIES, Inc.

CHARTER MEMBER: ASSOCIATION OF ENVIRONMENTAL LABORATORIES

4150 LIFT DRIVE

IRVING, ILLINOIS 60152

EARL E. ROSENBERG,
President

H. R. THOMAS, JR.
Director

June 18, 1976

Mr. Robert A. Carlson
555 South O'Plaine Road
Gurnee, Illinois 60051

Re: S/L #4965

Dear Mr. Carlson:

Please find enclosed the laboratory data generated on the sample of paper mill sludge material we received for analysis.

Review of the laboratory data reveals substantial levels of toxic materials present. Namely, lead and mercury.

The other materials present and their respective concentrations are also at levels which are above normally allowable limits set for waste discharge.

Should some of these materials find their way into water sources, being used now, they could cause serious health disorders.

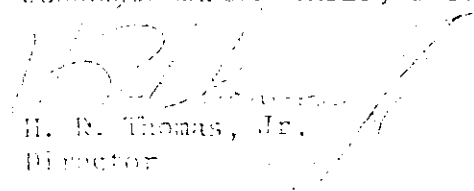
Also the immediate effect on the wildlife, both in and around the area, could be disastrous.

As more and more of the material is put into the waterway, the effects could have an even further reaching impact than is apparent now.

Thank you for using Suburban Laboratories' services and if you have any further questions, please feel free to call me.

Sincerely,

SUBURBAN LABORATORIES, INC.


H. R. Thomas, Jr.
Director

HRT:lh

P.O. No.

SAMPLE PREPARATION

Carlson - Sledge Pkwy
Results

Sampling Method: By Client ☒ By Sub. Lab. ☐ Serco Auto Sampler ☐ Other ☐

ANALYSIS

Our products are in accordance with the American Public Health Association Standard Methods, 13th Edition.

CONTROLLED BY:

Date 6/15/76 in

SUBURBAN LABORATORIES, Inc.

CHEMICAL ANALYSTS SINCE 1936

4110 LIT Drive • Phone 312/544-3260 • HILLSDALE, ILLINOIS 60062

ANALYSIS REPORT

NO. 14955

P.O. No. _____

Mr. Robert A. Carlson
555 South O'Plaine Road
Gurnee, Illinois 60031

Sample Recd. 4/26/76

Tests Completed

6/15/76

SAMPLE INFORMATION

Source #4963 - Paper Mill Sludge, 4/26

Comments (All analysis on dry basis)

Sampling Method: By Client ☒ By Sub. Lab. _____ Serco Auto-Sampler _____ Other _____

ANALYSIS

		#4963				#4963			
Total Solids	mg/l					Nitrogen-Tot	mg/l		
Fix. Tot. Sol.	mg/l					Nitrogen-Amm	mg/l		
Vol. Tot. Sol.	mg/l					Nitrogen-Org	mg/l		
Diss. Solids	mg/l					Nitrite	mg/l		
Settle. Sol.	ml/l					Nitrate	mg/l		
Tot. Sus. Sol.	mg/l					Phosphate (Total)	mg/l		
Fix. Sus. Sol.	mg/l					Phosphate (Ortho)	mg/l		
Vol. Sus. Sol.	mg/l					Sulfate	mg/l		
						Sulfide	mg/l		
BOD	mg/l					Sulfite	mg/l		
COD	mg/l					Aluminum	mg/l		
DO	mg/l					Antimony	mg/l		
						Arsenic	mg/l		
Phenols	ug/l					Barium	mg/l		
ARS or LAS	mg/l					Beryllium	mg/l		
Oils & Greases	mg/l					Boron	mg/l		
						Cadmium	mg/l		
Tot. Bact. Cells/100 ml						Calcium	mg/l		
Tot. Coli. Cells/100 ml						Chrom-Tot	mg/l		
Fecal Coli. Cells/100 ml						Chrom-Hex.	mg/l		
Lignin %		4.45				Chrom-Tot.	mg/l		
pH						Copper	mg/l		
Spec. Cond.						Iron	mg/l		
Alkalinity mg/l as CaCO ₃						Lead	mg/l	86.5	
Acidity mg/l as CaCO ₃						Lithium	mg/l		
Tot. Hard. mg/l as CaCO ₃						Magnesium	mg/l		
Resid. Cl ₂	mg/l					Manganese	mg/l		
Bromide	mg/l					Mercury	ug/l	33.1	
Chloride	mg/l					Nickel	mg/l		
Fluoride	mg/l					Potassium	mg/l		
Cyanide-Tot	mg/l					Silver	mg/l		
Cyanide-Free	mg/l					Sodium	mg/l		
						Strontium	mg/l		
Moisture %		61.27				Tin	mg/l	21.5	
Ash %		21.16				Zinc	mg/l	62.9	
Cellulose %		16.01							

Our methods are in accordance with the American Public Health Association, Standard Methods 13th Edition.

ANALYSIS CERTIFIED BY:

[Signature]

Heater

Date

6/15/76